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ABSTRACT

As part of an ongoing effort to gather information on the impact of college courses on students' academic skills, a small group of nursing students (n=35) at Boise State University, Idaho, enrolled in an upper division nursing course agreed to take the Academic Profile, a test that measures general academic skills. The results for these nursing students (21 seniors, 4 juniors, 4 sophomores, 1 freshman, and 5 designated "other") were compared to those for Boise State freshmen tested in fall 2001, and results for seniors were compared with those of upper classmen at 60 other comprehensive colleges and universities who also took the Academic Profile. The mean scores of nursing students were significantly higher than those of freshmen in all areas except mathematics. The biggest differences in skill levels were found for reading and writing, and natural sciences showed the greatest chance in subject matter areas. While it is tempting to say that the higher scores of the nursing majors reflects the fact that they have completed more credits than freshmen, showing the value of college and general education, it may simply reflect the "survival" of students. It may be that who is in college changes, rather than skill levels. An appendix describes skill levels from the Academic Profile. (SLD)

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Research Reports

Institutional Assessment
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# *Academic Profile Results for Selected Nursing Students*

***Research Report 2002 – 05***
***Marcia J. Belcheir***
***Coordinator, Office of Institutional Assessment***

***Boise State University***
***August 2002***

As part of an on-going effort to gather information on the impact of college courses on students' academic skills, a small group of nursing students (N=35) enrolled in an upper division nursing course agreed to take the Academic Profile, a test that measures general academic skills. The nursing group consisted of 21 seniors, 4 juniors, 4 sophomores, 1 freshman, and 5 who designated themselves as "other." Their results were compared to those of Boise State freshmen who entered and were tested in Fall, 2001. Senior nursing results (N=21) also were compared to the average scores of upper classmen at 60 other comprehensive colleges and universities.

A number of score comparisons were available from the Academic Profile. Besides a total score, Critical Thinking, Reading, Writing, and Mathematics group scores were provided. Students were then classified as "proficient," "marginal," or "not proficient" at three levels of mathematics, writing, and reading (where the third level of reading is designated as Critical Thinking). For further details on proficiency, see Appendix A. The items also were written to cover topics in the Humanities, Social Sciences, and Natural Sciences so scores also were available for these content areas.

## Nursing Majors Compared to New Freshmen at Boise State

As shown by Table 1 below, nursing students' mean scores were significantly higher than freshman scores in all areas except mathematics. Besides total score, the biggest differences in skills levels were found for reading and writing. For the subject areas, natural sciences showed the biggest change.



HE 036 153

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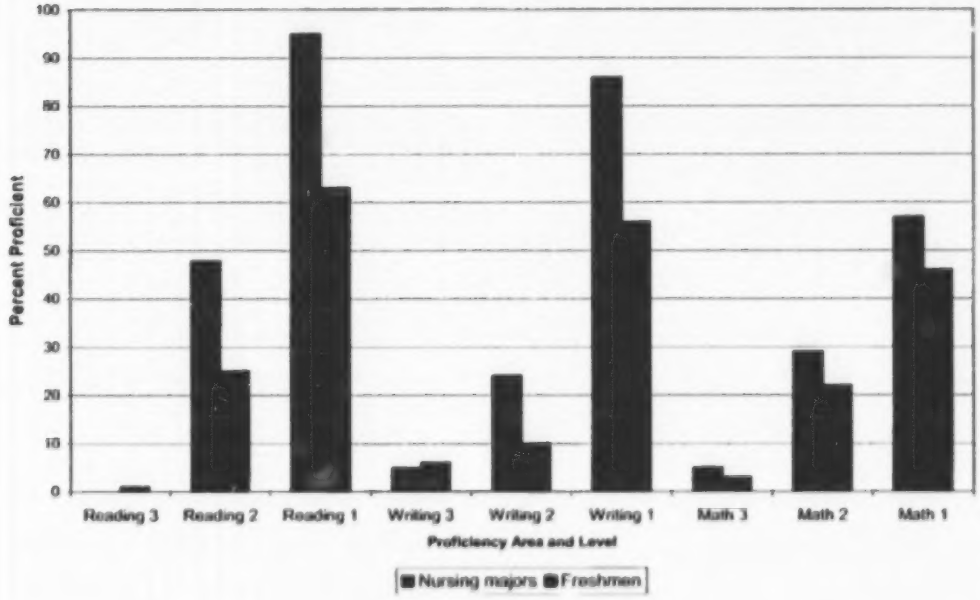
Table 1. Average scores on the Academic Profile for a Sample of Boise State Nursing Students and Entering Freshmen

| Score: | Nursing Students (N=35) | | Entering Freshmen (N=623) | |
|---|---|---|---|---|
| | Mean | Std. Deviation | Mean | Std. Deviation |
| Total Score* | 450.91 | 16.20 | 439.27 | 16.65 |
| Critical Thinking* | 112.09 | 5.02 | 109.49 | 5.74 |
| Reading* | 121.63 | 6.06 | 117.42 | 6.96 |
| Writing* | 116.60 | 4.66 | 113.34 | 4.82 |
| Mathematics | 113.80 | 4.53 | 112.38 | 5.18 |
| Humanities* | 116.17 | 5.31 | 113.74 | 5.98 |
| Social Sciences* | 115.23 | 6.21 | 112.37 | 6.14 |
| Natural Sciences* | 116.91 | 5.56 | 113.69 | 5.49 |

*Indicates statistical significance at $\alpha = .05_{2\text{-tail}}$

Figure 1 shows that these higher scores translated into greater proficiency at both levels 1 and 2 in all areas (reading, writing, mathematics). However, at the highest level—level 3—neither nursing students nor new freshmen had much proficiency. This was particularly true for Critical Thinking (also called Reading Level 3) where no nursing majors and only 1% of freshmen were found to be proficient.

**Figure 1. Proficiency in Reading, Writing, and Math at Three Levels**



## Nursing Senior Results Compared to Upperclassmen at Other Universities

Were the academic skills of Boise State's nursing students similar to those of upperclassmen at other comprehensive colleges and universities? As shown by Table 2 below, our nursing majors had total scores that were significantly higher than other upperclassmen. Scores also were higher for the skill area of reading and the subject area of social sciences. Our nursing seniors and other upperclassmen had similar scores in the writing skill area and the humanities subject area. Nursing majors were significantly below upperclassmen at other universities in critical thinking and mathematics as well as the natural sciences.

| Score area: | Boise State Senior Nursing Majors | | Upperclassmen at Other Comprehensive Colleges | |
|---|---|---|---|---|
| Total Score* | 452.43 | 14.07 | 448.6 | 6.3 |
| Critical thinking* | 111.86 | 4.95 | 112.4 | 2.1 |
| Reading* | 122.71 | 5.31 | 120.0 | 2.2 |
| Writing | 116.67 | 3.68 | 116.6 | 1.5 |
| Mathematics* | 114.33 | 4.59 | 114.9 | 2.2 |
| Humanities | 116.29 | 5.26 | 116.1 | 2.0 |
| Social Sciences* | 116.10 | 5.12 | 115.1 | 1.9 |
| Natural Sciences* | 116.86 | 5.68 | 117.5 | 2.0 |

*Indicates statistical significance at $\alpha=.05_{2\text{-tail}}$

## Discussion

Nursing students had higher skills levels and greater mastery of content compared to entering Boise State freshmen in almost all areas. Mathematics was the lone exception where no difference was found. Other institutions that measured students' skills levels at entry and again after several years have often found an actual decline in mathematics scores over the course of several years unless students continue to take mathematics during college. Presumably, this is due to forgetting math skills the longer they remain unused. Perhaps the recent requirement that all students must complete a mathematics course as part of their general education requirements will result in a similar change at Boise State.

It is tempting to say that the higher scores for nursing majors were probably due to the fact that they have completed more credits than entering freshmen, thereby showing the value of college and general education. However, it must also be acknowledged that the differences may be due to simple survival and selection, i.e., it may be that who is in college changes rather than skill levels. Over time, a number of freshmen will leave the university, many with poor grades which are due—at least in part—to inadequate academic skills. Nursing majors have already shown that they have the academic skills to remain in college.

Overall, Boise State senior Nursing majors outperformed upperclassmen at other comprehensive colleges and universities. Looking more closely by skill area, our students had higher scores in reading, lower scores in critical thinking, and similar scores in writing. In the general education

content areas, they scored higher in social sciences, lower in natural sciences, and similarly in the humanities.

From a broad university perspective, the results are positive. They show probable growth while at Boise State and indicate that the general education received by nursing majors was comparable to that received by upperclassmen at other institutions. The weaknesses were critical thinking and mathematics. If other data in the future show a similar pattern, any revision to the general education curriculum would probably want to include a look at these skill areas.

## Appendix A

### Writing Skills

At a level 1, a student can:

- Recognize agreement among basic grammatical elements (e.g. nouns, verbs, pronouns, conjunctions).
- Recognize appropriate transition words.
- Recognize incorrect word choice.
- Order sentences in a paragraph.
- Order elements in an outline.

At a level 2, a student can:

- Incorporate new material into a passage.
- Recognize agreement among basic grammatical elements (e.g. nouns verbs, pronouns, conjunctions) when these elements are complicated by intervening words or phrases.
- Combine simple clauses into single, more complex combinations.
- Recast existing sentences into new syntactic combinations.

At a level 3, a student can:

- Discriminate between appropriate and inappropriate uses of parallelism.
- Discriminate between appropriate and inappropriate uses of idiomatic language.
- Recognize redundancy.
- Recognize the most effective revision of a sentence.

### Mathematics Skills

At a level 1, a student can:

- Solve word problems that would most likely be solved by arithmetic and do not involve conversion of units or proportionality. These problems can be multi-step if the steps are repeated rather then embedded.
- Solve problems involving the informal properties of numbers and operations, often involving the Number Line, including positive and negative numbers, whole numbers and fractions (including conversions of common fractions to percents, such as converting ¼ to 25%).
- Solve problems requiring a general understanding of square roots and the squares of numbers.
- Solve a simple equation or substitute numbers into an algebraic expression.
- Find information from a graph. This task may involve finding a specified piece of information in a graph that also contains other information.

At level 2, a student can:

- Solve arithmetic problems with some complications, such as complex wording, maximizing or minimizing, and embedded ratios. These problems include algebra problems that can be solved by arithmetic (the answer choices are numeric).
- Simplify algebraic expressions, perform basic translations, and draw conclusions from algebraic equations and inequalities. These tasks are more complicated than solving a simple equation, though they may be approached arithmetically by substituting numbers.
- Interpret a trend represented in a graph, or choose a graph that reflects a trend.
- Solve problems involving sets; the problems would have numeric answer choices.

At level 3, a student can:

- Solve word problems that would unlikely be solved by arithmetic; the answer choices are either algebraic expressions or are numbers that do not lend themselves to back-solving.
- Solve problems involving difficult arithmetic concepts such as exponents and roots other than squares and square roots and percent of increase or decrease.
- Generalize about numbers, e.g. identify the values of (x) for which an expression increases as (x) increases.
- Solve problems requiring an understanding of the properties of integers, rational numbers, etc.
- Interpret a graph in which the trends are to be expressed algebraically or in which one of the following is involved: exponents and roots other than squares and square roots, percent of increase or decrease
- Solve problems requiring insight or logical reasoning.

## Reading/Critical thinking

At level 1, a student can:

- Recognize factual material explicitly presented in a reading passage.
- Understand the meaning of words or phrases in the context of a reading passage.
- Understand the meaning of words or phrases in the context of a reading passage.

At level 2, a student can:

- Synthesize material from different sections of a passage.
- Recognize valid inferences derived from material in the passage.
- Identify accurate summaries of a passage or of significant sections of the passage.
- Understand and interpret figurative language.
- Discern main idea, purpose, or focus of a passage or of a passage or a significant portion of a passage.

At level 3 (Critical Thinking), a student can:

- Evaluate competing casual explanations.
- Evaluate hypotheses for consistency with known facts.
- Determine the relevance of information for evaluating an argument an argument or conclusion.

- Determine whether an artistic interpretation is supported by evidence contained in a work.
- Recognize the salient features or themes in a work of art.
- Evaluate the appropriateness of procedures for investigating a question of causation.
- Recognize flaws and inconsistencies in an argument.

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| Signature: M Belcheir | | Printed Name/Pos: Marcia J. Belcheir, Coordinator Office of Institutional Assessment | |
| Organization/Address: | Boise State University<br>1910 University Drive<br>Boise, Idaho 83725 | Telephone: (208) 426-1117 | FAX: (208) 426-3779 |
| | | E-Mail Address: mbelcheir@boisestate.edu | Date: 8-22-03 |

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